ABSTRACT OF THE DISCLOSURE

The present invention provides a method and precursor for forming a metal and/or metal nitride layer on the substrate by chemical vapor deposition. The organometallic precursor has the formula of $(Cp(R)_n)_xMH_{y-x}$, where Cp is a cyclopentadienyl functional group, R is a substituent on the cyclopentadienyl functional group comprising an organic group having at least one carbon-silicon bond, n is an integer from 0 to 5, x is an integer from 1 to 4, M is a metal, and y is the valence of the metal M. A metal, metal nitride, metal carbon nitride, or metal silicon nitride film is deposited on a heated substrate by thermal or plasma enhanced decomposition of the organometallic precursor in the presence of a processing gas, such as hydrogen, nitrogen, ammonia, silane, and combinations thereof, at a pressure of less than about 20 Torr. By controlling the reactive gas composition either metal or metal nitride films may be deposited. The deposited metal or metal nitride film may then be exposed to a plasma to remove contaminants, densify the film, and reduce film resistivity.